Name: **KEY** Period: \_\_\_\_\_\_\_\_\_\_\_\_\_

Conversions with Scientific Notation: Notes

Numbers can be written in standard form and in scientific notation.

**Standard Form:** 5,200,000,000,000

**Scientific Notation:** 5.2 × 1012

Numbers written in scientific notation are made up of three parts:

**5.2 × 1012**

**Exponent**

**shows the number of decimal places that the decimal needs to be moved to change the number to standard form.**

**(A negative exponent indicates that the decimal is moved to the left when changing to standard notation.)**

**Coefficient**

* **greater than or equal to 1**
* **less than 10**

**Base**

**always 10**

***Examples***: Tell whether each number is written correctly in scientific notation. If it is incorrectly written, **state the reason**. **(These are from page 61, example 1.)**

1. A horse chestnut has a diameter of about 2 ∙ 100 centimeters.

**Correct**

1. Neptune is about 4.488 ∙ 109 kilometers from the sun.

**Correct**

1. The approximate wavelength of infrared light is 0.01 ∙ 10-5 meters.

**Incorrect. The coefficient is less than 1 – it needs to be greater than or equal to 1.**

1. A football field (excluding end zones) is 10 ∙ 101 yards long.

**Incorrect. The coefficient is 10. It needs to be less than 10.**

***Examples:*** Write each number in scientific notation.

427.7 35560020.3 45,000,000,000,000

**4.277 × 102 3.55600203 × 107 4.5 × 1013**

***Examples:*** Write each number in standard form.

7.1 ∙ 103 8 ∙ 106 6.33 ∙ 107

**7,100 8,000,000 63,300,000**

***Comparing Lengths***

The blue whale is the largest animal in the world. Blue whales can grow up to about 1320 inches (110 feet). The average height of the American male is 69.5 inches (5 feet 9.5 inches). The blue whale may be the largest animal in the world, but on land the elephant is the largest animal. Elephants can grow up to 156 inches long (13 feet).

1. Use the height of the average man and the length of the blue whale. How many times as large as the man is the whale? Write your answer in scientific notation.

**69.5 *x* = 1320**

***x* = about 19 times as large**

**The blue whale is 1.9 × 101 times larger than the average human man.**

1. Use the height of the average man and the length of the elephant. How many times as large as the man is the elephant? Write your answer in scientific notation.

**69.5 *x* = 156**

***x* = about 2.2 times as large**

**The elephant is about 2.2 × 100 times larger than the average human man.**